Chemistry 129 Quiz #7

Name: _____

Solve the following problems:

1. (6 pts) Find K for the following reaction:

   $2\ HF_{(aq)} + C_2O_4^{2-}{}_{(aq)} \leftrightarrow 2\ F^-_{(aq)} + H_2C_2O_{4(aq)}$ (1) $K_C = ?$

   Use the following data to find the unknown K_C.

   $\frac{1}{2}\ H_2C_2O_{4(aq)} \leftrightarrow H^+_{(aq)} + \frac{1}{2}\ C_2O_4^{2-}{}_{(aq)}$ (2) $K = 1.9 \times 10^{-3}$

   $H^+_{(aq)} + F^-_{(aq)} \leftrightarrow HF_{(aq)}$ (3) $K = 1.5 \times 10^{3}$

2. Consider the following reaction and its equilibrium constant:

   $I_{2\,(g)} + Cl_{2\,(g)} \leftrightarrow 2\ ICl_{(g)}$ $K = 81.9$

   A reaction mixture contains $[I_2] = 0.114$ M, $[Cl_2] = 0.102$M, and $[ICl] = 0.355$M. Is the reaction mixture at equilibrium? If not, in which direction will the reaction proceed?

3. (7 pts.) The following reaction is exothermic.

$$C_6H_{12}O_{6\,(s)} + 6\ O_{2\,(g)} \leftrightarrow 6\ CO_{2\,(g)} + 6\ H_2O_{\,(g)}$$

(a) Predict the effect (shift right, shift left, or no effect) of the following:

i. Adding some O_2 to the reaction mixture - _____

ii. Removing some $C_6H_{12}O_6$ from the reaction mixture - _____

iii. Increasing the temperature of the reaction mixture - _____

iv. Increasing the volume of the reaction mixture - _____

v. Adding some H_2O to the reaction mixture - _____

vi. Adding a catalyst to the reaction mixture - _____

(b) Will the equilibrium constant of the reaction increase or decrease if the temperature is reduced?

4. (8 pts) Consider the dissolution of silver cyanide in water:

$$CaF_{2(s)} \leftrightarrow Ca^{2+}_{(aq)} + 2F^-_{(aq)} \qquad K = 3.45x10^{-11}$$

(a) Based on the value of K, is CaF_2 a soluble or insoluble salt? Explain.

(b) Write the equilibrium constant expression. Is the equilibrium homogeneous or heterogenous?

(c) Find the $[Ca^{2+}]$ and $[F^-]$ at equilibrium.

(d) Find K for $Ca^{2+}_{(aq)} + F^-_{(aq)} \leftrightarrow CaF_{2(s)}$